DOE OFFICE OF INDIAN ENERGY

Public Private Partnerships for Financing Energy Efficiency and Renewable Energy Deployment

Renewable Energy & Efficiency for Alaska Native Villages Workshop

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U.S. DEPARTMENT OF ENERGY | Office of Indian Energy

Renewable Energy Financing

Renewable Energy Certificates

Partnership Mechanisms

Interconnection

Subsidies

Rebates

Net Metering

Cash/Financing

Tax Credits & Exemptions

Renewable Portfolio Goals

Cost of Electricity/Payback

To Partner or Not to Partner? Key Questions:

1. Tax paying entity or not?
2. Available cash on hand or access to financing?
3. System ownership preferences or requirements?
4. Treatment of renewable energy certificates?
5. State laws regulating third party ownership?

ENERGY SAVINGS PERFORMANCE CONTRACTING

Energy Savings Performance Contracting (ESPC)

An ESPC is a **no upfront cost** contracting mechanism between a site customer and an energy service company (ESCO). Energy conservation measures are financed and implemented by an ESCO which is **repaid through energy savings**.

Over 90 DOE Qualified ESCOs, including:

AMERESCO Green • Clean • Sustainable

Chevron Energy Solutions

Honeywell

Johnson Controls

McKinstry For The Life Of Your Building

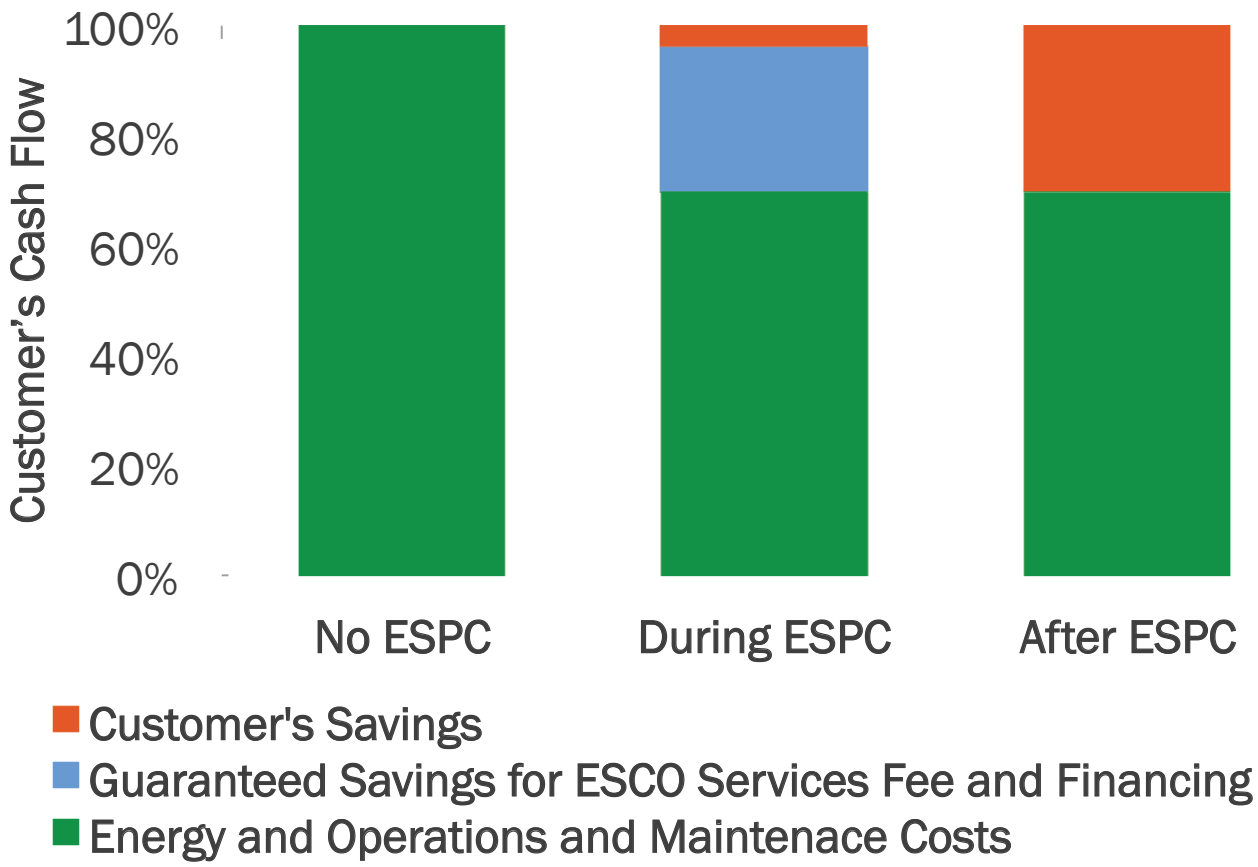
SIEMENS

TETRA TECH

TRANE

For Full DOE Listing: http://www1.eere.energy.gov/femp/financing/espcs_qualifiedescos.html

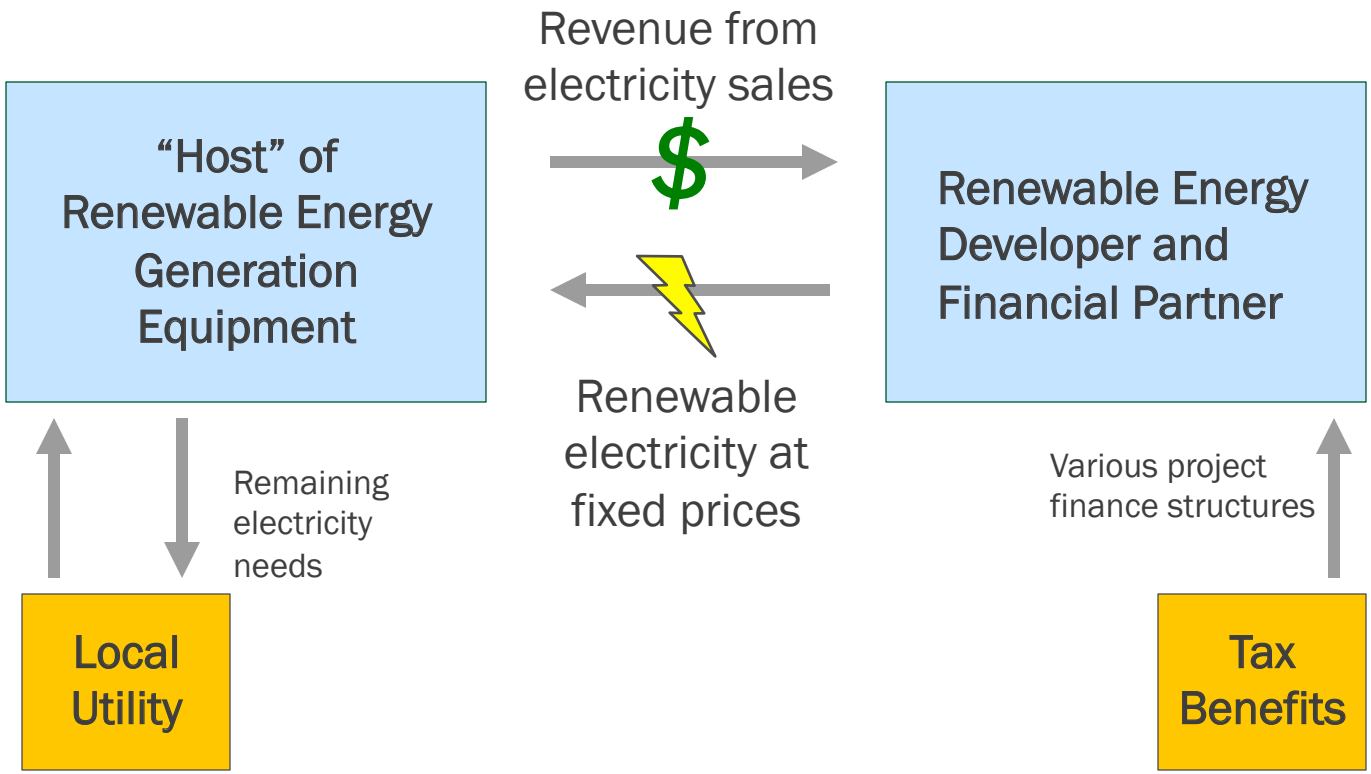
ESPC's Re-allocate Current and Future Energy Spending



POWER PURCHASE AGREEMENTS

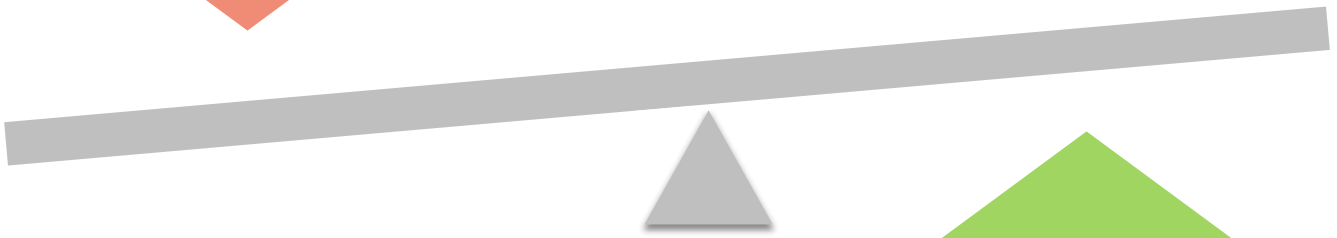
Third Party Power Purchase Agreement

The customer agrees to **host** the system and **purchase** the electricity



PPA Considerations to Weigh

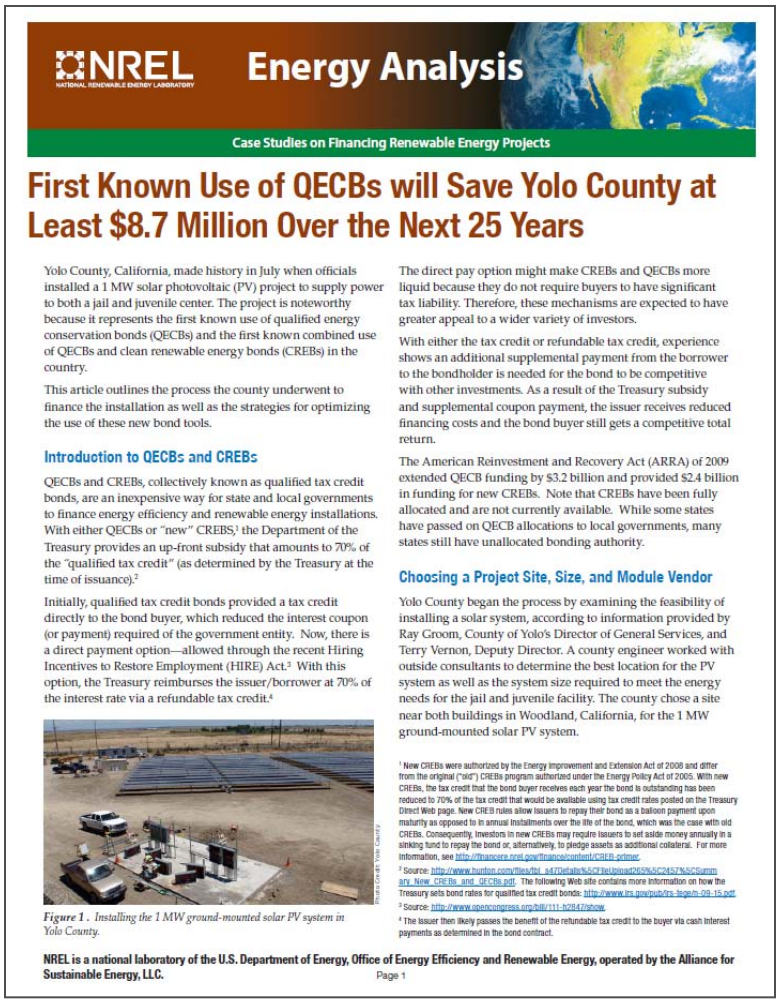
- May not beat current electricity rates
- Tough economics for small projects
- Higher transaction costs
- REC and project ownership requirements



- No Upfront Costs
- No O&M
- Benefit from tax incentives
- Lock-in energy price
- Path to ownership

QUALIFIED ENERGY CONSERVATION BONDS

Qualified Energy Conservation Bonds (QECBs)



NREL Energy Analysis

NATIONAL RENEWABLE ENERGY LABORATORY

Case Studies on Financing Renewable Energy Projects

First Known Use of QECBs will Save Yolo County at Least $8.7 Million Over the Next 25 Years

Yolo County, California, made history in July when officials installed a 1 MW solar photovoltaic (PV) project to supply power to both a jail and juvenile center. The project is noteworthy because it represents the first known use of qualified energy conservation bonds (QECBs) and the first known combined use of QECBs and clean renewable energy bonds (CREBs) in the country.

This article outlines the process the county underwent to finance the installation as well as the strategies for optimizing the use of these new bond tools.

Introduction to QECBs and CREBs

QECBs and CREBs, collectively known as qualified tax credit bonds, are an inexpensive way for state and local governments to finance energy efficiency and renewable energy installations. With either QECBs or "new" CREBS,[1] the Department of the Treasury provides an up-front subsidy that amounts to 70% of the "qualified tax credit" (as determined by the Treasury at the time of issuance).[2]

Initially, qualified tax credit bonds provided a tax credit directly to the bond buyer, which reduced the interest coupon (or payment) required of the government entity. Now, there is a direct payment option—allowed through the recent Hiring Incentives to Restore Employment (HIRE) Act.[3] With this option, the Treasury reimburses the issuer/borrower at 70% of the interest rate via a refundable tax credit.[4]

Figure 1. Installing the 1 MW ground-mounted solar PV system in Yolo County.

The direct pay option might make CREBs and QECBs more liquid because they do not require buyers to have significant tax liability. Therefore, these mechanisms are expected to have greater appeal to a wider variety of investors.

With either the tax credit or refundable tax credit, experience shows an additional supplemental payment from the borrower to the bondholder is needed for the bond to be competitive with other investments. As a result of the Treasury subsidy and supplemental coupon payment, the issuer receives reduced financing costs and the bond buyer still gets a competitive total return.

The American Reinvestment and Recovery Act (ARRA) of 2009 extended QECB funding by $3.2 billion and provided $2.4 billion in funding for new CREBs. Note that CREBs have been fully allocated and are not currently available. While some states have passed on QECB allocations to local governments, many states still have unallocated bonding authority.

Choosing a Project Site, Size, and Module Vendor

Yolo County began the process by examining the feasibility of installing a solar system, according to information provided by Ray Groom, County of Yolo's Director of General Services, and Terry Vernon, Deputy Director. A county engineer worked with outside consultants to determine the best location for the PV system as well as the system size required to meet the energy needs for the jail and juvenile facility. The county chose a site near both buildings in Woodland, California, for the 1 MW ground-mounted solar PV system.

[1] New CREBs were authorized by the Energy Improvement and Extension Act of 2008 and differ from the original ("old") CREBs program authorized under the Energy Policy Act of 2005. With new CREBs, the tax credit that the bond buyer receives each year the bond is outstanding has been reduced to 70% of the tax credit that would be available using tax credit rates posted on the Treasury Direct Web page. New CREB rules allow issuers to repay their bond as a balloon payment upon maturity as opposed to in annual installments over the life of the bond, which was the case with old CREBs. Consequently, investors in new CREBs may require issuers to set aside money annually in a sinking fund to repay the bond or, alternatively, to pledge assets as additional collateral. For more information, see http://financere.nrel.gov/finance/content/CREB-primer.

[2] Source: http://www.hunton.com/files/tbl_s47Details%5CFileUpload265%5C2457%5CSCSummary_New_CREBs_and_QECBs.pdf. The following Web site contains more information on how the Treasury sets bond rates for qualified tax credit bonds: http://www.irs.gov/pub/irs-tege/n-09-15.pdf.

[3] Source: http://www.opencongress.org/bill/111-h2847/show.

[4] The issuer then likely passes the benefit of the refundable tax credit to the buyer via cash interest payments as determined in the bond contract.

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Yolo County Case Study of QECBs:
http://www.nrel.gov/docs/fy11osti/49450.pdf

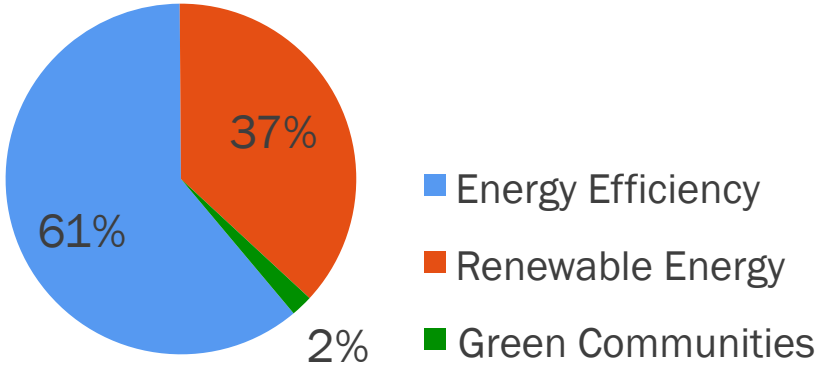
How they work:

- Federally subsidized bonds that allow governments and tribes to **borrow** money at very low costs and for long periods
- *LOAN - Not a grant!*

Alaskan QECB allocation:

- More than $7M issued to Alaska
- Entirety of allocation still remaining

Use of QECBs by project type:



Source: Energy Programs Consortium, Sep. 2012 QECB memo.
http://www.energyprograms.org/wp-content/uploads/2012/09/QECB_Memo_9-5.pdf

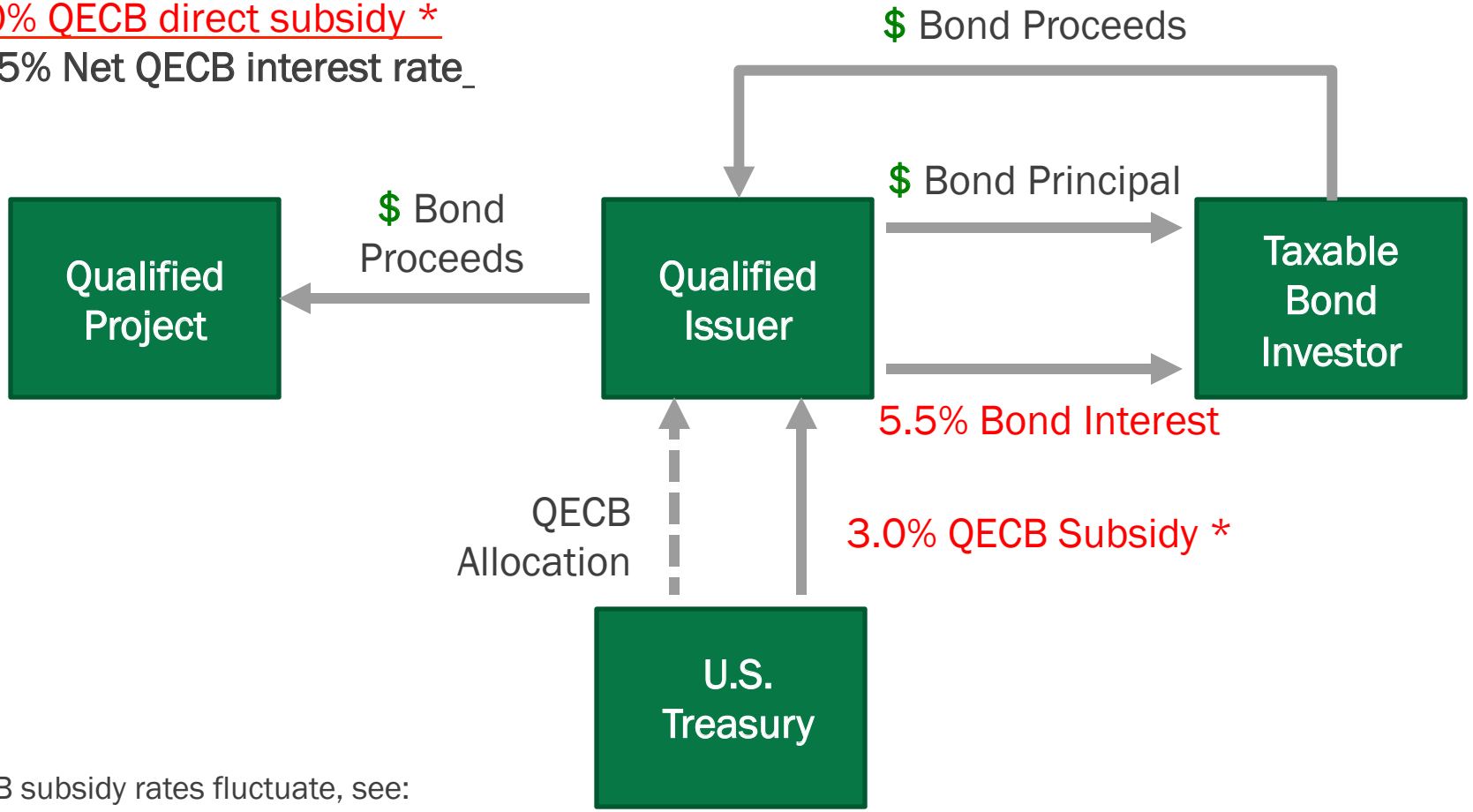
QECB Mechanics and Subsidy Example

Example:

5.5% taxable bond issued by tribe

-3.0% QECB direct subsidy *

=2.5% Net QECB interest rate_

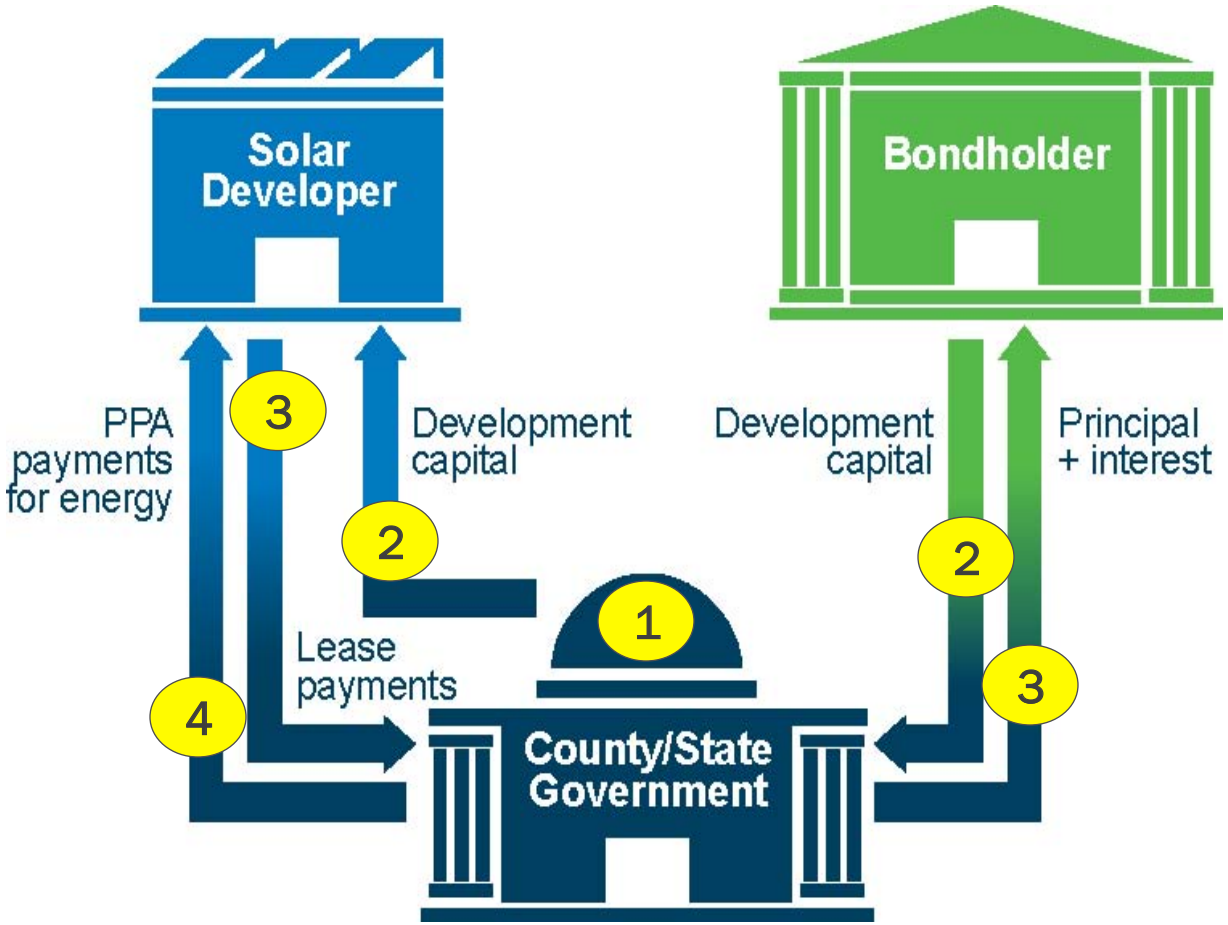


* QECB subsidy rates fluctuate, see:

https://www.treasurydirect.gov/GA-SL/SLGS/selectQTCDate.htm

BOND + CAPITAL LEASE + PPA

Hybrid Bond + Lease + PPA (Morris Model)



Transactions

1. Bond issuance
2. Bond proceeds and RE ownership passed to developer through a lease-purchase
3. Lease payments used to repay principal and interest to bondholders
4. Issuer purchases renewable electricity at reduced rates due to tax incentives (PPA) & low interest loan (bond)

Hybrid Bond + Lease + PPA

NREL NATIONAL RENEWABLE ENERGY LABORATORY

Science & Technology

Fact Sheet Series on Financing Solar PV at Government Sites

Financing Solar PV at Government Sites with PPAs and Public Debt

Historically, state and local governmental agencies have employed one of two models to deploy solar photovoltaic (PV) projects: (1) self-ownership (financed through a variety of means) or (2) third-party ownership through a power purchase agreement (PPA). Morris County, New Jersey, administrators recently pioneered a way to combine many of the benefits of self-ownership and third-party PPAs through a bond-PPA hybrid, frequently referred to as the Morris Model.

At the request of the Department of Energy's Solar Market Transformation group, NREL examined the hybrid model. This fact sheet:

- Describes how the hybrid model works
- Assesses the model's relative advantages and challenges as compared to self-ownership and the third-party PPA model
- Provides a quick guide to project implementation
- Assesses the replicability of the model in other jurisdictions across the United States.

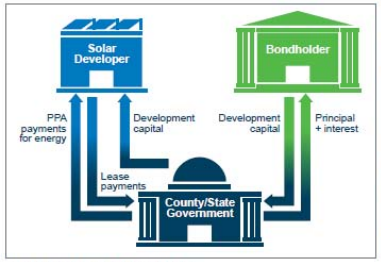


Figure 1. Money transfers in the hybrid model

The Bond-PPA Hybrid

The hybrid model is a financing option by which a public entity issues a government bond at a low interest rate and transfers that low-cost capital to a developer in exchange for a lower PPA price.[1] To date, the model has been used to finance solar PV projects on schools, colleges, county administrative buildings, and other public buildings in several jurisdictions in New Jersey. Implementers have achieved notable energy cost savings as compared to projections of their local electricity rate; the four portfolios that have been finalized to date have saved between $3 million and $14.6 million on a net present value (NPV) basis. The model has potential to be transferred to other states, but it is unknown at this point if governments in other states are planning to implement the model.

Under the model, a public entity (the *administrator*) issues a request for proposals (RFP) seeking a solar developer to build, operate, and own a solar project or portfolio of projects on public buildings (*local hosts*). The administrator sells bonds to finance the development costs of the PV installation. The administrator then enters into both a lease-purchase agreement with the winning bidder[2] and a PPA (on behalf of the local hosts) to buy the electricity from the PV system. Figure 1 shows the relationship and money flows between the bondholder, administrator, and solar developer.

[1] These types of arrangements are not unique to New Jersey. For example, the City of Denver provided low-interest capital (raised through appropriations) to a developer to build two Denver International Airport solar projects in 2009 (Morrissey 2011). The city did not provide a construction loan; instead, capital was provided after plant commissioning.
[2] The lease-purchase agreement transfers ownership of the project to the solar developer for federal tax purposes.

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Office of Energy Efficiency and Renewable Energy, operated by the Alliance for Sustainable Energy, LLC.

Detailed Financing Information Available At:
http://www.nrel.gov/docs/fy12osti/53622.pdf

Morris County, New Jersey

- Aggregation: 3.2 MW from 19 facilities for 7 local governments
- Credit quality: Bond Pricing with AAA County Guaranty: 4.46%
- Savings: Expected to save $2M; year 15 PPA price equal to today's retail price

Contact Information:

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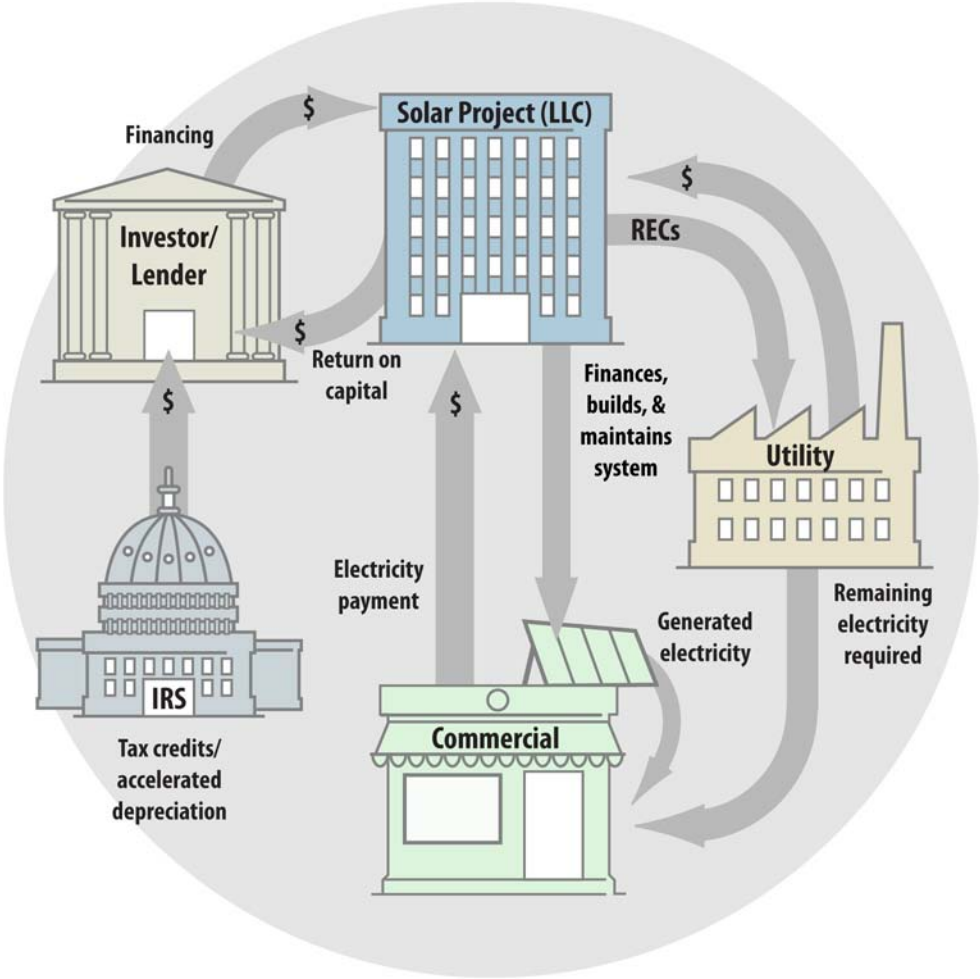
Source: SunEdison and NREL. Alamosa Colorado. 8.2 MW

SUPPLEMENTAL SLIDES

Power Purchase Agreement



Simple LCOE Tools: Geo, Wind, PV

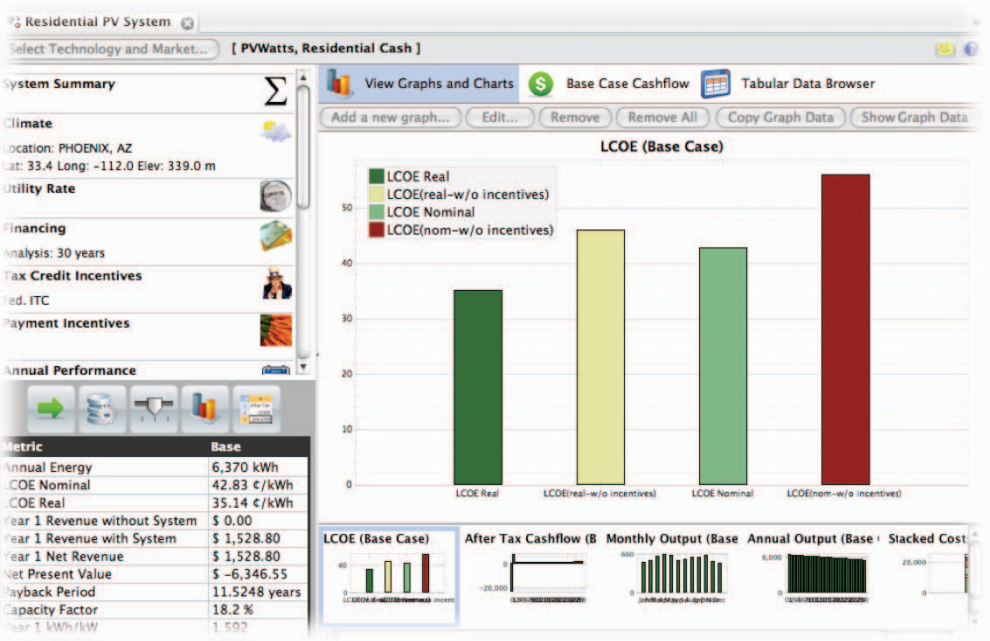
- Cost of Renewable Energy Spreadsheet Tool (CREST) Model:
- Designed to give PUCs & others a tool & methodology to quickly evaluate LCOE
- Can handle simple or complex level of inputs (user's choice)
- Simple to operate – no macros
- Outreach and interaction tool:
  - PUCs
  - Utilities
  - Other Stakeholders
- Solar, geothermal and wind

- Whitepaper:
- *"Renewable Energy Cost Modeling:*
- *A Toolkit for Establishing Cost-Based Incentives in the United States"*

Check				Notes
	Selected Technology		Photovoltaic	?
	Project Size and Performance			
	Generator Nameplate Capacity	*kW dc*	2,200	?
	DC-to-AC Conversion Efficiency	%	77.0%	?
				?
	Net Capacity Factor, Yr 1	*%, ac*	18.5%	?
	Production, Yr 1	*AC kWh*	2,745,296	?
	Annual Production Degradation	%	0.5%	?
	Project Useful Life	*years*	25	?
	Feed-in Tariff Payment Duration	*years*	25	?
	Feed-In Tariff Escalation Rate	%	2.0%	?
	% of Year-One Tariff Rate Escalated	%	30.0%	?
	Capital Costs			
	Select Cost Level of Detail		Intermediate	?
				?
	Generation Equipment	$	$10,500,000	?
	Balance of Plant	$	$0	?
	Interconnection	$	$0	?
	Development Costs & Fee	$	$0	?
	Reserves & Financing Costs	$	$488,815	?
				?
	Total Installed Cost	$	$10,988,815	?
	Total Installed Cost		$4.99	?

Advanced Tool: NREL's System Advisor Model (SAM)

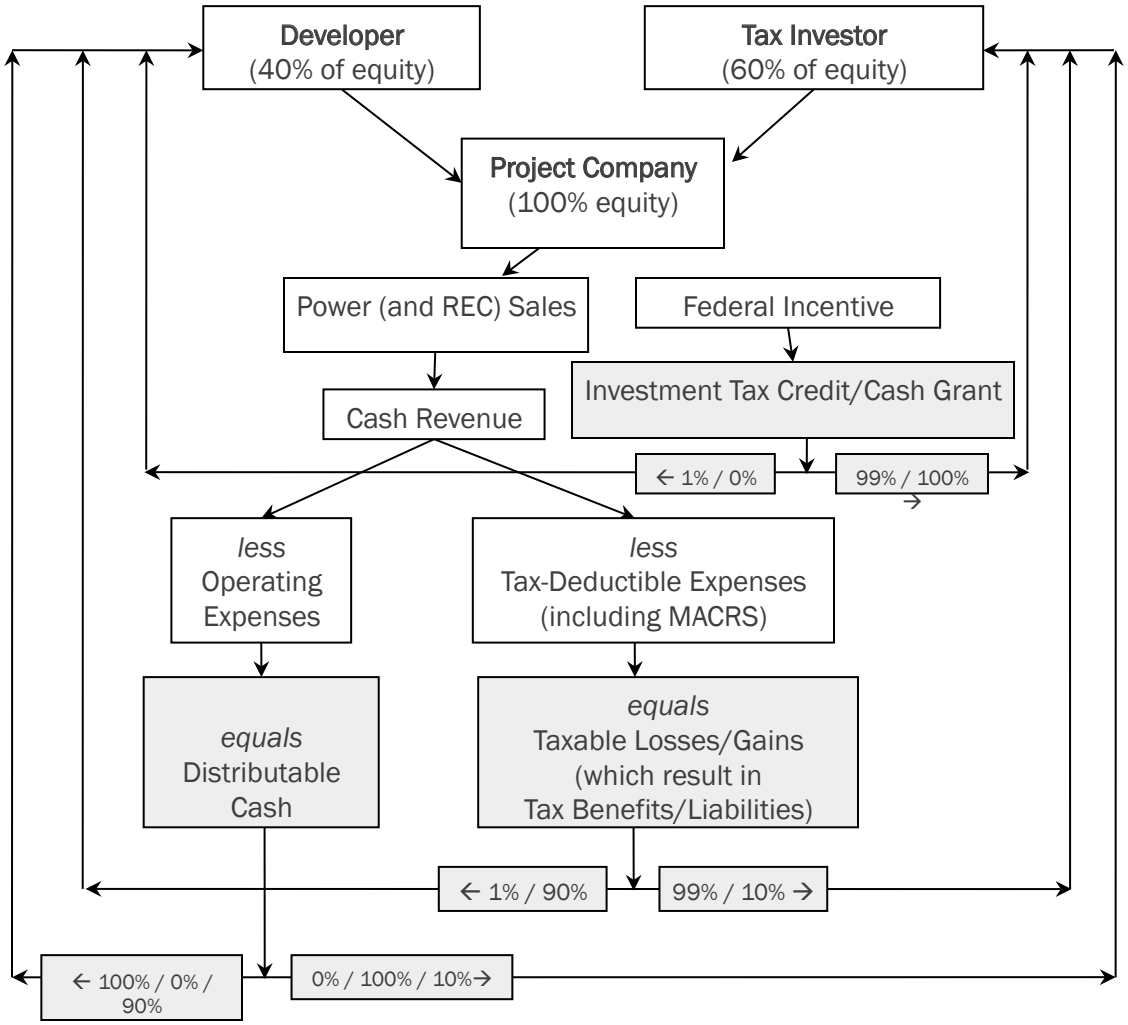
Available at: https://www.nrel.gov/analysis/sam/



Advanced Tool: Financing Structures Included in System Advisor Model (SAM)

Partnership Type / Characteristics	All Equity Partnership Flip	Leveraged Partnership Flip	Sale Leaseback	Single Owner
Equity Owners	Tax Investor / Developer	Tax Investor / Developer	Tax Investor (Lessor)	Developer (Third party if sold)
Project Debt	None	Yes	None	Potential (Owner Choice)
Return Target	Tax Investor After-Tax IRR (Flip Target)	Tax Investor After-Tax IRR (Flip Target)	Lessor After-Tax IRR	Owner After-Tax IRR
Cash Sharing	Pre-Flip: Bifurcated Post-Flip: Primarily Developer	Pre-Flip: Pro Rata Post-Flip: Primarily Developer	Lessor: Lease Payment Lessee: Project Margin	Owner: 100% of project cash
Tax Benefit Sharing	Pre-Flip: Primarily Tax Investor Post-Flip: Primarily Developer	Pre-Flip: Primarily Tax Investor Post-Flip: Primarily Developer	Lessor and Lessee have different taxable incomes	Owner: 100% of project tax benefits

Financial Structures Can Be Complex!

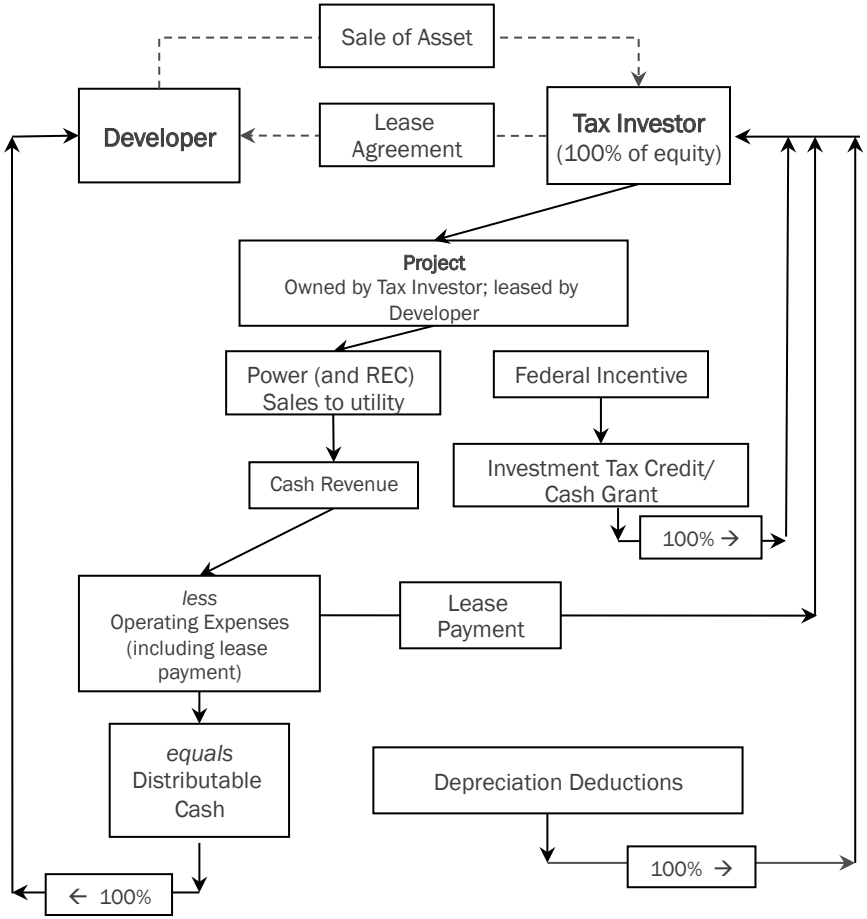


All-Equity Partnership Flip:

- TI provides a majority (e.g., 60%) of equity. Specific allocations set for each project.
- Pre-Flip Point, there are bi-furcated allocations:
  - Cash: initially 100% to developer (for either fixed duration or until return of investment); then 100% to TI until flip target reached
  - Tax Benefits: 99% to TI from COD until flip target reached
- After Flip Point is reached, virtually all allocations go to developer.

Tools – Adding Adv. Financial Structures to SAM

Sale Leaseback



Structure Details:

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